LISTING OF THE CLAIMS

1. (Previously Presented) A microfluidic device, comprising:
an enrichment module configured to receive a microdroplet of particle-containing fluid, the enrichment module comprising a flow-through member and an enrichment chamber, wherein the flow-through member is configured to allow fluid of the particle-containing fluid to pass through the flow-through member thereby accumulating an enriched particle sample, comprising particles of the particle-containing fluid, in the enrichment chamber;
a downstream channel leading downstream from the enrichment chamber to at least one downstream processing module;
an actuator configured to move the enriched particle sample downstream from the enrichment module along the downstream channel; and
a first valve disposed between the actuator and the flow-through member.

2. (Canceled)

3. (Previously Presented) The microfluidic device of claim 1, wherein the flow-through member is configured to sieve particles from the particle-containing fluid.

4. (Canceled)

5. (Canceled)

6. (Previously Presented) The microfluidic device of claim 1, further comprising a second valve disposed between the flow-through member and the downstream channel.

7. (Previously Presented) The microfluidic device of claim 6, wherein the actuator is a gas actuator, and the device is configured to move the enriched particle sample from the enrichment chamber to the downstream channel by opening the first and second valves and actuating the gas

actuator to thereby increase a gas pressure within the enrichment chamber relative to a gas pressure within the downstream channel.

8. (Previously Presented) The microfluidic device of claim 6, wherein the device comprises a lower substrate and an upper substrate, and wherein the enrichment module, downstream channel, first valve, second valve, and actuator are integral with the upper substrate.

9. (Previously Presented) The microfluidic device of claim 6, wherein the actuator is a gas actuator and the device is configured to move the enriched particle sample from the enrichment chamber to the downstream channel by opening the first and second valves and actuating the gas actuator to thereby decrease a gas pressure within the downstream channel relative to a gas pressure in the enrichment chamber.

10. (Canceled)

11. (Previously Presented) The microfluidic device of claim 1, wherein the at least one downstream processing module includes a mixing zone configured to combine a predetermined portion of the enriched particle sample with a predetermined amount of a reagent.

12. (Previously Presented) The microfluidic device of claim 11, wherein the mixing zone is configured to combine only a portion of the enriched particle sample received by the downstream channel with the predetermined amount of reagent.

13. (Canceled).

14. (Currently Amended) The microfluidic device of claim [[10,]] 1, wherein the at least one downstream processing module includes a lysing module comprising a source of electrical energy to lyse cells in the enriched particle sample.

15. (Previously Presented) The microfluidic device of claim 14, wherein said lysing module includes a positioning element to position the enriched particle sample in a lysing position with respect to the lysing zone.

16. (Currently Amended) The microfluidic device of claim [[10,]] 1, wherein the at least one downstream processing module includes a DNA manipulation zone configured to subject the enriched particle sample and a reagent to polymerase chain reaction to provide amplified polynucleotides.

17. (Canceled)

18. (Previously Presented) The microfluidic device of claim 1, further comprising a sample input module connected to the flow-through member via a sample introduction channel.

19. (Previously Presented) A microfluidic device, comprising:
an enrichment module configured to separate an enriched particle sample from a microdroplet of particle-containing fluid, wherein the enrichment module comprises a flow-through member and an enrichment chamber;
a processing module disposed downstream of the enrichment module;
an actuator configured to move the enriched particle sample downstream from the enrichment module with essentially no dilution of the enriched particle sample; and
a first valve disposed between the actuator and the flow-through member.

20. (Previously Presented) The microfluidic device of claim 19, wherein the flow-through member is configured to substantially prevent passage of particles of the particle-containing fluid while allowing liquid of the particle-containing fluid to exit the enrichment module.

21. (Previously Presented) The microfluidic device of claim 20, wherein the flow-through member is configured to sieve particles from the particle-containing fluid.

22. (Canceled)

23. (Previously Presented) The microfluidic device of claim 19 further comprising a second valve disposed between the flow-through member and the processing module.

24. (Previously Presented) The microfluidic device of claim 23 wherein the device is configured to move the enriched particle sample downstream from the enrichment module by opening the first and second valves and actuating the actuator.

25. (Previously Presented) The microfluidic device of claim 19, wherein the device further comprises a substrate, and the enrichment module, first valve, and actuator are integral with the substrate.

26. (Previously Presented) The microfluidic device of claim 19, wherein the actuator is a gas actuator and is configured to drive a volume of gas against an upstream portion of the enriched particle sample.

27. (Canceled)

28. (Canceled)

29. (Canceled)

30. (Previously Presented) The microfluidic device of claim 19, wherein the processing module includes a lysing module, and wherein said lysing module includes a positioning element to position the enriched particle sample in a lysing position with respect to the lysing zone.

31. (Previously Presented) The microfluidic device of claim 19, wherein the lysing module comprises a source of electrical energy to lyse cells in the sample.

32. (Previously Presented) The microfluidic device of claim 19, wherein the processing module comprises a DNA manipulation module configured to subject the enriched particle sample and a reagent to a polymerase chain reaction thereby providing amplified polynucleotides.

33. (Previously Presented) The microfluidic device of claim 32, wherein the device comprises a substrate and the enrichment module and DNA manipulation module are integral with the substrate.

34. (Canceled)

35. (Canceled)

36. (Canceled)

37. (Canceled)

38. (Previously Presented) The device of claim 8, wherein the flow-through member has first and second surfaces, wherein the first surface is adjacent the enrichment chamber, and the second surface is spaced apart from the enrichment chamber and is adjacent a self-contained space, wherein the self-contained space contains an absorbent material and is disposed in the upper substrate on a surface of the upper substrate opposite to the lower substrate.

39. (Previously Presented) The device of claim 8, wherein:

the lower substrate has a glass base and an oxide layer, wherein the oxide layer contains a plurality of resistive heaters;

and wherein the upper substrate has a bottom surface, bonded to the oxide layer on the lower substrate.

40. (Previously Presented) The microfluidic device of claim 1, wherein the actuator is a thermally actuated gas actuator.

41. (Previously Presented) The microfluidic device of claim 39, wherein the actuator is integral with the upper substrate.

42. (Previously Presented) The microfluidic device of claim 39, wherein the actuator is a thermally actuated gas actuator and comprises a resistive heater located beneath a chamber in the upper substrate.

43. (Previously Presented) The microfluidic device of claim 42, wherein the resistive heater is in thermal contact with the chamber, and wherein the chamber contains a volume of gas.

44. (Previously Presented) The microfluidic device of claim 6, wherein the first and second valves are thermally actuated.

45. (Previously Presented) The microfluidic device of claim 6, wherein the first and second valves are reversible between an open and a closed state.

46. (Previously Presented) The microfluidic device of claim 6, wherein the first and second valves comprise a thermally responsive substance.

47. (Previously Presented) The device of claim 1, wherein the flow-through member comprises a material having pathways smaller than the diameter of particles in the particle containing fluid.

48. (Previously Presented) The microfluidic device of claim 47, wherein the flow-through member has pores of less than about 2 microns in diameter.

49. (Previously Presented) The microfluidic device of claim 47, wherein the flow-through member is made from a material selected from the group consisting of: paper, textiles, polymers having a network of pathways, and glassy materials.

50. (Previously Presented) The microfluidic device of claim 1, wherein the enriched particle sample has a substantially higher ratio of particles per volume of fluid than a corresponding ratio of the particle containing fluid.

51. (Previously Presented) The microfluidic device of claim 50, wherein the ratio is about 250.

52. (Previously Presented) The microfluidic device of claim 19, wherein the flow-through member comprises a material having pathways smaller than the diameter of particles in the microdroplet of particle containing fluid.

53. (Previously Presented) The microfluidic device of claim 19, wherein the actuator is a thermally actuated gas actuator.

54. (Previously Presented) The microfluidic device of claim 23, wherein the first and second valves are thermally actuated.

55. (Previously Presented) The microfluidic device of claim 23, wherein the first and second valves are reversible between an open and a closed state.

56. (Previously Presented) The microfluidic device of claim 23, wherein the first and second valves comprise a thermally responsive substance.